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CURRENT LITERATURE

BOOK REVIEWS

Plant physiology

The third German edition of JOST'S *Lectures on plant physiology*[1] shows certain changes from the first edition in general organization and point of view. Instead of the headings "Stoffwechsel," "Formwechsel," and "Energiewechsel," for the general divisions of the subject, the new edition has "Stoffwechsel," "Formwechsel," and "Ortwechsel." The heading "Energiewechsel" is used for chap. xix, the last chapter under "Stoffwechsel." This brings the energy transformations into close connection with the source of the energy, which is quite desirable in contrast with the attempt to connect it with any particular manifestation of energy, as movement. Lecture 17 of the new edition has the heading "Oxidation of hydrogen sulfid, hydrogen, methane, and ammonia by bacteria. Carbon assimilation without light and chlorophyll." It corresponds to lecture 18 of the first edition with the heading "Sulfo and nitro bacteria." Several other changes appear in lecture headings, indicative of change in viewpoint or content. The introductory lecture to "Formwechsel" has been cut down to five introductory paragraphs in the chapter on "Growth of the cell." The 43 lectures of the first edition thus become 42 in the present edition, but the pages have increased from 695 to 760.

As one reads this excellent treatise, he is impressed by the number of subjects of which the author has an excellent critical grasp; plant physiology, plant anatomy, evolution and heredity, physiological chemistry, etc. JOST has a genius for organization and is apparently a natural teacher free from pet theories or hobbies. One is inclined to compare him, as a teacher and organizer of the subject, with SACHS, remembering, however, that the task of organizing the subject is now far more difficult, owing to the enormous amount of experimentation and range of knowledge to be included. In most parts of the treatise there are excellent summaries of the subjects, entirely up to date. This is illustrated by the statement on the synthesis of amino acids, lecithin, proteins, etc., which embodies the late work of TRIER and others; by the greatly improved statement on catalysis and enzyme action; and by the lectures on hybridization and heredity, on variation, and on species-formation.

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[1] JOST, LUDWIG, Vorlesungen über Pflanzenphysiologie. xvi+760. *figs. 194.* Jena: Gustav Fischer. 1913.

The reviewer believes that JOST'S treatment of transpiration could be greatly improved by adopting LIVINGSTON'S idea and method of relative transpiration. This gives quantitative determination of the inhibitory and regulating factors at work in the leaf under various conditions. The very exact work of BRIGGS and SHANTZ on wilting coefficient is passed over with mere citation, and data obtained from the rather indefinite work of SACHS on non-available water.

Many will believe that JOST'S meager and derogatory statement of the place of colloids in plant physiology is very inadequate and faces away from future progress in the subject. The statement on dormancy in seeds could have been written twenty years ago as well as now. JOST apparently attempts to illuminate the simple by the complex when he likens the temperature curve for rate of diastatic action to similar curves for protoplasmic activity. It would be very much more to the point to explain that we know very largely the chemistry and physics of the first curve. Rise of temperature increases the rate of diastatic action with a rather constant coefficient (somewhat less than 2 for each 10° rise). It also increases the rate of coagulation of the enzyme, especially rapidly at higher temperatures, hence the high optimum. The coagulation is a function of the time as well as of the temperature. This accounts for the optimum being much lower when the duration of the experiment is great. The failure of JOST to apply the idea of time as a factor in coagulation of proteins by heat is evident a number of times in the book, especially in his dismissal of LEPESCHKIN'S conclusion that death in general from supramaximal temperatures is due to the coagulation of cell proteins. While at one point JOST accepts and clearly discusses BLACKMAN'S conclusions on "optima and limiting factors," he frequently lapses into the older German view and phraseology. JOST'S arguments in favor of the claim that rate of water absorption by a cell as affected by temperature is a matter of protoplasmic regulation are rather weakened by the recent work of BROWN and WORLEY on barley grains, in which they found that temperature effects appear with about the same coefficient when non-living membranes only or chiefly are involved. Many of these criticisms are an outgrowth of JOST'S peculiar brand of vitalism. If he is convinced beyond a doubt that a physical or chemical explanation holds, he accepts it, but at too many points in his lectures he fails to outline the attack along these lines.

In spite of its virtues in organization, the book could be greatly improved by better organization of the materials within the chapters and by a far more extensive index. At many points the author makes extensive detours from the subject under discussion. Graduate students frequently complain that they must read certain lectures several times and finally reorganize them before they can be held in mind. Paragraph headings such as BARNES or NATHANSOHN have used would serve the double purpose of making the plan of organization more evident and perhaps of leading to a better plan. An author index separate from or as a part of a more extensive general index would render the material of the book more accessible.—WILLIAM CROCKER.

Biochemistry of plants

In revision, the first volume of CZAPEK'S *Biochemistry of plants*[2] has grown from 584 pages to 828 pages. The historical introduction contains 18 pages as in the previous edition. The portion on "general biochemistry" contains 220 pages as compared with 77 pages in the old edition. Under "special biochemistry" the first part ("The sugars in the metabolism of plants") has been increased from 397 pages to 469; and the second part ("The lipoids in the metabolism of plants") has grown from 94 pages to 112. One of the most notable changes in the general organization of the book is the treatment of the lipoids after the sugars instead of before. This seems desirable because of the order of synthesis of the two groups of substances in the plant.

The "general biochemistry" contains the two chapters of the old edition, "The substratum of the chemical processes in the living organism" and "Chemical reactions in the living plant organism," with two additional chapters entitled "Chemical stimulation effects" and "The chemistry of adaptation and heredity." In this part one is impressed with the excellent summary of the literature on general characters of colloids, gels and adsorption phenomena, catalysis, general chemistry of enzymes, and kinetics of enzyme action.

The part on sugars in the metabolism of plants shows few changes in organization. The additional space used is largely due to the growth of the literature of the subject.

The part on lipoids is divided into two sections, "The nutrient lipoids of the plant" and "The cytolipoids of plants." In the first section, the chapter headings are identical with those of the first edition: "The reserve fats of seeds," "Resorption of fats in seed germination," "Fat synthesis in ripening seeds and fruits," "Reserve fats in stems and leaves," "Reserve fats in thallophytes, mosses, ferns, and pollen grains." The section on cytolipoids has undergone some changes in organization and more in content. The chapter headings are "Plant cerebrosides," "Sterinolipoids of plants (phytosterol and related bodies)," "Plant chromolipoids," and "The production of wax."

The table of contents has been greatly improved by the addition of heads and subheads, giving a much better grouping of the chapters. The treatment of such subjects as photosynthesis, alcoholic fermentation, respiration, and other plant processes reminds one that the work is by no means a plant chemistry in the narrow sense of the word. It is more nearly a physiology of metabolism in plants, with main emphasis on the fundamental chemistry and physics involved in the processes.—WILLIAM CROCKER.

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[2] CZAPEK, FR., Biochemie der Pflanzen. 2d ed. Vol. I. pp. xix+928. Jena: Gustav Fischer. 1913.